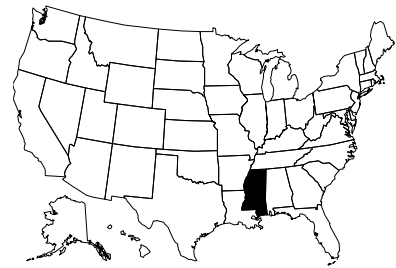


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Program Description

The Mississippi Department of Environmental Quality (MDEQ) has a Surface Water Monitoring Program (SWMP), which:

- Meets the requirements of Section 106 of CWA,
- Monitors, assesses and reports overall status and trends of surface water quality state-wide,
- Identifies impaired waterbodies and determines causes and sources of impairment,
- Determines effectiveness and supports monitoring and assessment activities of other Surface Water Division (SWD) Programs,
- Addresses surface water quality issues and economic development interests of public concern, and
- Determines better ways of monitoring and assessing surface waters.

Biological data collection, assessment and reporting are an integral component of MDEQ's SWMP and have been for many years. In addition, biological data are a primary assessment component of MDEQ's 305(b) and 303(d) reporting processes. Specifically, macroinvertebrate assessment results are used in the process of determining aquatic life use support and for identifying impaired waterbodies. Macroinvertebrate data are also used to complement other environmental data throughout the TMDL process, including stressor identification and TMDL implementation monitoring. A probabilistic survey design is planned for incorporation into MDEQ's ongoing ambient monitoring network in the future. This approach is intended to produce a more accurate, scientifically defensible and comprehensive assessment of biological condition throughout the state. This will result in collection of biological data at a combination of fixed and random stations each year in conjunction with MS DEQ's Basin Management Approach.

In 2001, MDEQ redesigned its biological monitoring and assessment program to include more rigorous training; field sampling; laboratory sorting, subsampling, and taxonomy; analytical methods; and documentation. It included a comprehensive QA Project Plan with detailed standard operating procedures (SOPs), revision of data entry and database management procedures, and documentation of data quality characteristics throughout the entire assessment process. Approximately 450 wadeable stream sites were sampled statewide with the exception of the MS River Alluvial Plain during a winter index period for benthic macroinvertebrates, physical habitat quality, substrate particle size distribution, and selected field and analytical chemistry. Using GIS, the drainage area for the each site was delineated and land use characterized. For five bioregions, reference conditions were developed based on the concept of "best attainable" conditions, and a multimetric index of biological integrity calibrated, the Mississippi Benthic Index of Stream Quality (M-BISQ).

Documentation and Further Information

State of Mississippi Water Quality Assessment 2002 Section 305(b) Report, Big Black River Basin Supplement:
<http://www.deg.state.ms.us> Click: OPC then Surface Water then 305(b)

State of Mississippi 2002 List of Waterbodies, 303(d) Report: <http://www.deg.state.ms.us> Click: TMDLs

State of Mississippi Water Quality Criteria for Intrastate, Interstate and Coastal Waters, October 2002:
<http://www.deg.state.ms.us> Click: MDEQ Regulations then By Type then Water then WPC-1

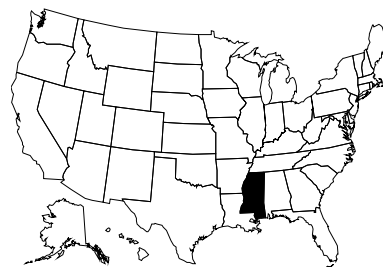
Quality Assurance Project Plan for 303(d) List Assessment and Calibration of the Index of Biological Integrity for Wadeable Streams in Mississippi.

Development and Application of the Mississippi Benthic Index of Stream Quality (M-BISQ).

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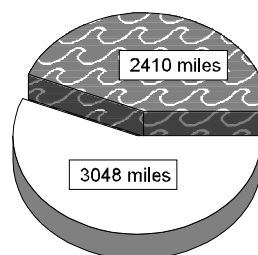
Programmatic Elements

Uses of bioassessment within overall water quality program	<input checked="" type="checkbox"/>	problem identification (screening)
	<input checked="" type="checkbox"/>	nonpoint source assessments
	<input checked="" type="checkbox"/>	monitoring the effectiveness of BMPs
	<input checked="" type="checkbox"/>	ALU determinations/ambient monitoring
	<input type="checkbox"/>	promulgated into state water quality standards as biocriteria
	<input checked="" type="checkbox"/>	support of antidegradation
	<input checked="" type="checkbox"/>	evaluation of discharge permit conditions
	<input checked="" type="checkbox"/>	TMDL assessment and monitoring
Applicable monitoring designs	<input type="checkbox"/>	other:
	<input checked="" type="checkbox"/>	targeted (i.e., sites selected for specific purpose) (<i>comprehensive use throughout jurisdiction</i>)
	<input checked="" type="checkbox"/>	fixed station (i.e., water quality monitoring stations) (<i>comprehensive use throughout jurisdiction</i>)
	<input type="checkbox"/>	probabilistic by stream order/catchment area
	<input type="checkbox"/>	probabilistic by ecoregion, or statewide
	<input checked="" type="checkbox"/>	rotating basin (<i>comprehensive use throughout jurisdiction</i>)
		other:

Stream Miles

Total miles (determined using RF3)	84,003
Total perennial miles	26,454
Total miles assessed for biology	5,458
fully attaining ALUS for 305(b)	2,410
not fully attaining ALUS for 305(b)	3,048
listed for 303(d)	3,048
number of sites sampled	455
number of miles assessed per site	~12

5,458 Miles Assessed for Biology



☒ "fully supporting" for 305(b)
☐ "partially/non-supporting" for 305(b)

*MDEQ implemented a new biological assessment program (started in fall, 2001). Miles assessed for biology and 305(b)/303(d) numbers reflect this change and vary significantly from previous assessments.

NOTE: All information contained in this summary refers to procedures adopted under the *new* bioassessment program.

Aquatic Life Use (ALU) Designations and Decision-Making

ALU designation basis	Single Aquatic Life Use	
ALU designations in state water quality standards	One designation: Fish and Wildlife (biological data are only assessed for fish and wildlife classification)	
Narrative Biocriteria in WQS	Presently, there are no written informal/formal numeric procedures to support narrative biocriteria decisions. Available procedures support a general aquatic life standard.	
Numeric Biocriteria in WQS	none	
Uses of bioassessment data in integrated assessments with other environmental data (e.g., toxicity testing and chemical specific criteria)	<input checked="" type="checkbox"/>	assessment of aquatic resources
	<input checked="" type="checkbox"/>	cause and effect determinations
	<input checked="" type="checkbox"/>	permitted discharges
	<input checked="" type="checkbox"/>	monitoring (e.g., improvements after mitigation)
	<input checked="" type="checkbox"/>	watershed based management
Uses of bioassessment/biocriteria in making management decisions regarding restoration of aquatic resources to a designated ALU	none	

Reference Site/Condition Development

Number of reference sites	83 total	
Reference site determinations	<input type="checkbox"/>	site-specific
	<input type="checkbox"/>	paired watersheds
	<input checked="" type="checkbox"/>	regional (aggregate of sites)
	<input type="checkbox"/>	professional judgment
	<input type="checkbox"/>	other:
Reference site criteria	Surrounding landuse, physical habitat, substrate particle size, water chemistry, biology, and historical information.	
Characterization of reference sites within a regional context	<input type="checkbox"/>	historical conditions
	<input checked="" type="checkbox"/>	least disturbed sites
	<input type="checkbox"/>	gradient response
	<input type="checkbox"/>	professional judgment
	<input type="checkbox"/>	other:
Stream stratification within regional reference conditions	<input type="checkbox"/>	ecoregions (or some aggregate)
	<input type="checkbox"/>	elevation
	<input type="checkbox"/>	stream type
	<input type="checkbox"/>	multivariate grouping
	<input type="checkbox"/>	jurisdictional (i.e., statewide)
	<input checked="" type="checkbox"/>	other: bioregion
Additional information	<input checked="" type="checkbox"/>	reference sites linked to ALU
	<input type="checkbox"/>	reference sites/condition referenced in water quality standards
	<input checked="" type="checkbox"/>	some reference sites represent acceptable human-induced conditions

Field and Lab Methods

Assemblages assessed	<input checked="" type="checkbox"/>	benthos (<i>100-500 samples/year; single season, multiple sites - broad coverage</i>)
	<input type="checkbox"/>	fish
	<input type="checkbox"/>	periphyton
	<input type="checkbox"/>	other:
<hr/>		
Benthos		
sampling gear		D-frame net (800 x 900 micron mesh) for wadeable streams
habitat selection		multihabitat
subsample size		200 count
taxonomy		genus
<hr/>		
Habitat assessments		visual based habitat assessment and modified Wolman Pebble Count; performed with bioassessments
<hr/>		
Quality assurance program elements		standard operating procedures, quality assurance plan, periodic meetings and training for biologists, field and laboratory performance audits, sorting and taxonomic proficiency checks, specimen archival

Data Analysis and Interpretation

Data analysis tools and methods	<input checked="" type="checkbox"/>	summary tables, illustrative graphs
	<input type="checkbox"/>	parametric ANOVAs
	<input checked="" type="checkbox"/>	multivariate analysis*
	<input checked="" type="checkbox"/>	biological metrics (<i>aggregate metrics into an index</i>)
	<input checked="" type="checkbox"/>	disturbance gradients
	<input type="checkbox"/>	other:
<hr/>		
Multimetric thresholds		
transforming metrics into unitless scores		95 th percentile of all sites
defining impairment in a multimetric index		25 th percentile of reference condition
<hr/>		
Evaluation of performance characteristics**	<input checked="" type="checkbox"/>	repeat sampling (<i>different team, same reach; same team, adjacent reach</i>)
	<input checked="" type="checkbox"/>	precision (<i>repeat & duplicate field samples, repeat sorting, taxonomic & data checks</i>)
	<input checked="" type="checkbox"/>	sensitivity (<i>disturbance gradient for reference & degraded streams</i>)
	<input checked="" type="checkbox"/>	bias (<i>repeat, duplicate samples</i>)
	<input checked="" type="checkbox"/>	accuracy (discrimination efficiency)
<hr/>		
Biological data		
Storage		EDAS
Retrieval and analysis		Systat, Statistica and EDAS

* Multivariate analysis is being used to *develop* the new index, but the subsequent analysis of biological data will be multimetric.

**Additional evaluation procedures of performance characteristics include: field (biological, habitat and chemistry repeats), lab (pickate rechecks, QC checks), taxonomy (two taxonomists and a third party for precision; reference collection), data entry QC, and metric calculation QC checks.